

What is claimed is:

1. A metal-cladded metal matrix composite wire comprising:

a metal matrix composite core having an exterior surface, the metal matrix

composite core comprising:

at least one tow, wherein the tow comprises a plurality of continuous fibers that are oriented longitudinally with respect to each other, the fibers comprising at least one of ceramic or carbon;

a metal matrix, wherein each tow is positioned within the metal matrix; and

a metal cladding covering the exterior surface of the metal matrix composite core, wherein the metal cladding has a melting point not greater than 1100°C,

wherein the metal-cladded metal matrix composite wire, exhibits a roundness value of at least 0.95, a roundness uniformity value of not greater than 0.9%, and a diameter uniformity value of not greater than 0.2% over a length of least 100 meters.

2. The metal-cladded metal matrix composite wire of claim 1, wherein the metal matrix composite core comprises a plurality of tows.

3. The metal-cladded metal matrix composite wire of claim 2, wherein the metal-cladded metal matrix composite wire is plastically deformable.

4. The metal-cladded metal matrix composite wire of claim 2, wherein when a portion of the metal matrix composite core undergoes a primary fracture, the metal cladding is effective to dampen recoil effects and prevent secondary fractures in a segment of the metal-cladded metal matrix composite wire.

5. The metal-cladded metal matrix composite wire of claim 2, wherein the metal cladding exhibits a larger strain to failure as compared to the strain to failure exhibited by the metal matrix composite core in the absence of the metal cladding.
- 5 6. The metal matrix metal matrix composite wire of claim 5, wherein the metal matrix of the metal matrix composite core comprises at least one of aluminum, zinc, tin, magnesium, copper, or an alloy thereof.
- 10 7. The metal-cladded metal matrix composite wire of claim 5, wherein the metal matrix of the metal matrix composite core comprises at least one of aluminum or an alloy thereof.
- 15 8. The metal-cladded metal matrix composite wire of claim 5, wherein the metal matrix of the metal matrix composite core comprises at least 98 percent by weight aluminum, based on the total weight of the metal of the metal matrix composite core.
9. The metal-cladded metal matrix composite wire of claim 5, wherein the metal cladding has a melting point of not greater than 1000°C.
- 20 10. The metal-cladded metal matrix composite wire of claim 5, wherein the metal cladding has a melting point of not greater than 700°C.
- 25 11. The metal-cladded metal matrix composite wire of claim 5, wherein the metal cladding comprises at least one of aluminum, zinc, tin, magnesium, copper, or an alloy thereof.
12. The metal-cladded metal matrix composite wire of claim 5, wherein the metal cladding comprises at least one of aluminum or an alloy thereof.
- 30 13. The metal-cladded metal matrix composite wire of claim 5, wherein the metal cladding comprises at least 98 percent by weight aluminum, based on the total weight of the metal cladding.

14. The metal-cladded metal matrix composite wire of claim 5, wherein the metal cladding has a thickness in a range from 0.2mm to 6 mm.
- 5 15. The metal-cladded metal matrix composite wire of claim 5, wherein at least 85% of the fibers of each tow are continuous.
16. The metal-cladded metal matrix composite wire of claim 5, wherein the metal matrix composite core comprises in a range from 40 to 70 percent by volume of the fibers,
10 based on the total volume of the metal matrix composite core.
17. The metal-cladded metal matrix composite wire of claim 5, wherein the fibers are ceramic oxide fibers.
- 15 18. The metal-cladded metal matrix composite wire of claim 5, wherein the fibers are polycrystalline alpha alumina fibers.
19. The metal-cladded metal matrix composite wire of claim 18, wherein the fibers
20 comprise at least 99% by weight Al_2O_3 , based on the total metal oxide content of the fibers.
20. A cable comprising at least one metal-cladded metal matrix composite wire of claim 2.
- 25 21. The cable of claim 20 further comprising a plurality of the metal-cladded metal matrix composite wires helically stranded to form a homogenous cable.
22. The cable of claim 20 further comprising a plurality of secondary wires.
- 30 23. A cable comprising a plurality of the metal-cladded metal matrix composite wires of claim 2 wherein the wires are helically stranded in a permanent set.

24. A cable comprising a cable core and a shell, wherein the cable core comprises at least one metal-cladded metal matrix composite wire of claim 2 and the shell comprises secondary wires.

25. A metal-cladded aluminum matrix composite wire comprising:

an aluminum matrix composite wire having an exterior surface, the aluminum matrix composite wire comprising:

at least one tow, wherein the tow comprises a plurality of continuous fibers that are oriented longitudinally with respect to each other, the fibers comprising at least one of ceramic or carbon;

an aluminum matrix, wherein each tow is positioned within the aluminum matrix; and

a metal cladding covering the exterior surface of the aluminum matrix composite wire, wherein the metal cladding has a melting point not greater than 1100°C,

wherein the metal-cladded aluminum matrix composite wire, exhibits a roundness value of at least 0.98, a roundness uniformity value of not greater than 0.5%, and a diameter uniformity value of not greater than 0.2% over a length of least 100 meters.

26. The metal-cladded aluminum matrix composite wire of claim 25, wherein the aluminum matrix composite wire comprises a plurality of tows.

27. The metal-cladded aluminum matrix composite wire of claim 26, wherein the metal-cladded aluminum matrix composite wire is plastically deformable.

28. The metal-cladded aluminum matrix composite wire of claim 26, wherein when the aluminum matrix composite wire undergoes a primary fracture the metal cladding is effective to dampen recoil effects and prevent secondary fractures of the metal-cladded aluminum matrix composite wire.

29. The metal-cladded aluminum matrix composite wire of claim 26, wherein the metal cladding exhibits a larger strain to failure as compared to the strain to failure exhibited by the aluminum matrix composite wire in the absence of the metal cladding.

30. The metal-cladded aluminum matrix composite wire of claim 29, wherein the aluminum matrix of the aluminum matrix composite wire comprises at least one of aluminum or an alloy thereof.

31. The metal-cladded aluminum matrix composite wire of claim 29, wherein the aluminum matrix of the aluminum matrix composite wire comprises at least 98 percent by weight aluminum, based on the total weight of the aluminum of the aluminum matrix composite core.

32. The metal-cladded aluminum matrix composite wire of claim 29, wherein the metal cladding has a melting point of not greater than 1000°C.

33. The metal-cladded aluminum matrix composite wire of claim 29, wherein the metal cladding has a melting point of not greater than 700°C.

34. The metal-cladded aluminum matrix composite wire of claim 29, wherein the metal cladding comprises at least one of aluminum, zinc, tin, magnesium, copper, or an alloy thereof.

35. The metal-cladded aluminum matrix composite wire of claim 29, wherein the metal cladding comprises at least one of aluminum or an alloy thereof.

36. The metal-cladded aluminum matrix composite wire of claim 29, wherein the metal cladding comprises at least 98 percent by weight aluminum, based on the total weight of the metal cladding.

37. The metal-cladded aluminum matrix composite wire of claim 29, wherein the metal cladding has a thickness in a range from 0.2mm to 6 mm.

38. The metal-cladded aluminum matrix composite wire of claim 29, wherein at least 85% of the fibers of each tow are continuous.
- 5 39. The metal-cladded aluminum matrix composite wire of claim 29, wherein the aluminum matrix composite wire comprises in a range from 40 to 70 percent by volume of the fibers, based on the total volume of the aluminum matrix composite wire.
- 10 40. The metal-cladded aluminum matrix composite wire of claim 29, wherein the fibers are ceramic oxide fibers.
41. The metal-cladded aluminum matrix composite wire of claim 29, wherein the fibers are polycrystalline alpha alumina fibers.
- 15 42. The metal-cladded aluminum matrix composite wire of claim 41, wherein the fibers comprise at least 99% by weight Al_2O_3 , based on the total metal oxide content of the fibers.
- 20 43. A cable comprising at least one metal-cladded aluminum matrix composite wire of claim 26.
44. The cable of claim 43 further comprising a plurality of the metal-cladded aluminum matrix composite wires helically stranded to form a homogenous cable.
- 25 45. The cable of claim 43 further comprising a plurality of secondary wires.
46. A cable comprising a plurality of the metal-cladded aluminum matrix composite wires of claim 26, wherein the wires are helically stranded in a permanent set.
- 30 47. A cable comprising a cable core and a shell, wherein the cable core comprises at least one metal-cladded aluminum matrix composite wire of claim 26 and the shell comprises secondary wires.